# EXHIBIT 4

UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

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| NATIONAL ASSOCIATION FOR THE ADVANCEMENT OF COLORED PEOPLE, SPRING VALLEY BRANCH, *et al.*, | ECF CASE |
| **Plaintiffs,** | Case No. 7:17-cv-08943 |
| v. | DISTRICT JUDGE CATHY SEIBEL |
| EAST RAMAPO CENTRAL SCHOOL DISTRICT, *et al.*, | MAGISTRATE JUDGE JUDITH C. MCCARTHY |
| **Defendants.** | |

DECLARATION OF DR. JOHN ALFORD IN SUPPORT OF
DEFENDANT EAST RAMAPO CENTRAL SCHOOL DISTRICT'S
OPPOSITION TO MOTION FOR PRELIMINARY INJUNCTION

## I.    Background

1.    I have been retained by the East Ramapo Central School District (the

"District") as an expert to provide analysis related to *National Association for the Advancement*

*of Colored People, Spring Valley Branch v. East Ramapo Central School District*, a challenge to

the at-large method used in elections for seats on the Board of Education in the District.  My rate

of compensation as a testifying expert is $400 per hour.

## II.    Qualifications

2.    I am a tenured professor of political science at Rice University.  I have

taught courses on redistricting, elections, political representation, voting behavior, and statistical

methods at both the undergraduate and graduate level.

3.    Over the last thirty years, I have worked with numerous local governments

on districting plans and on Voting Rights Act issues.  I have previously provided expert reports

and/or testified as an expert witness in over a dozen cases.

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4.     The details of my academic background, including all publications in the last ten years, and work as an expert, including all cases in which I have testified by deposition or at trial in the last four years, are included in my curriculum vitae (Exhibit 1).

## III.    Scope of Inquiry

5.     I have been retained to evaluate the analysis and conclusions of Dr. Steven P. Cole, who prepared an expert report in support of Plaintiffs' Motion for Preliminary Injunction.

6.     I reviewed Dr. Cole's report, the sources to which he cites, and the additional materials produced with Dr. Cole's report.  I have also reviewed the transcript of Dr. Cole's deposition and the additional materials Dr. Cole produced to the District's counsel following his deposition.

7.     In his report, Dr. Cole concludes that Black voters in East Ramapo are politically cohesive, that there is a politically cohesive coalition of Black and Latino voters in East Ramapo, and that voting in East Ramapo is racially polarized.[1] In reaching those conclusions, Dr. Cole purportedly relied on four methods of analysis: King Ecological Inference (EI), Goodman Single-Equation Ecological Regression, Homogeneous Precinct Analysis, and "Supplemental Research."[2]

8.     In evaluating Dr. Cole's report, I considered the reliability of each of the four methods upon which Dr. Cole relied.  For each method, I sought to determine (1) whether the method could reliably be used to evaluate voting patterns in the District, (2) whether Dr. Cole applied the method correctly, and (3) whether Dr. Cole's analysis of each method was reasonable.  I also considered the analysis Dr. Cole used to reach his final conclusions.

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[1] Cole Report at 2; Cole Deposition Transcript (Cole Tr.) at 45-46.
[2] Cole Report at 9-12.

9.      It is my understanding that Dr. Cole used an EI analysis to estimate the proportion of voters, by race, who supported each candidate in Board elections in 2013 and 2015-2017.  In evaluating Dr. Cole's application of EI, I attempted to replicate Dr. Cole's results by conducting my own EI analysis.

10.      I conducted my analysis using the ei.MD.bayes routine contained in the eiPack statistical module for 'R'.  That package implements the technique described in Rosen, Jiang, King, and Tanner's 2001 article "Bayesian and Frequentist Inference for Ecological Inference:  the R x C Case".  Because I sought to replicate Dr. Cole's results, I used the same data inputs that he used to conduct his EI analysis—the official election results for each of the 2013, 2015, 2016, and 2017 election contests and the Citizen Voting Age Population ("CVAP") estimates, by race, that were generated by Plaintiffs' demography expert, Dr. William Cooper.[3]

11.      My evaluation of Dr. Cole's methods and analysis is based on the standards and practices that are generally accepted by social scientists and statisticians.

## IV.     Summary of Opinions

12.      Each of Dr. Cole's four methods of analysis suffers from serious methodological and analytical deficiencies.

13.      Dr. Cole's use of Homogenous Precinct Analysis cannot be used to determine whether there is racially polarized voting in District elections.

14.      Dr. Cole did not actually perform a Goodman Single Equation Ecological Regression.  Instead, he calculated the correlation coefficient between the racial composition of a precinct and the proportion of the vote a candidate received in that precinct.  This correlational approach cannot provide reliable estimates for the election data available here.

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[3] Cole Report at 37.

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15.     Dr. Cole's EI analysis is unreliable because Dr. Cole used an outdated and inaccurate method of EI, because there is not enough data and not enough useful variation across precincts to generate reliable estimates, and because Dr. Cole did not calculate appropriate confidence intervals.

16.     I conducted my own EI analysis to test Dr. Cole's EI estimates. Based on my EI analysis, I conclude that the vast majority of Dr. Cole's estimates of Black and Latino voting behavior are unreliable.

17.     Dr. Cole's use of supplemental evidence is not supported by any systematic methodology or explicit protocol. Dr. Cole's supplemental evidence cannot reliably establish the existence of racially polarized voting in the District.

## V.     Evaluation of Dr. Cole's Methodology

### A.     Ecological Inference Background

18.     Ecological inference (EI) generally refers to the statistical process of drawing inferences about individual behavior from aggregate data. EI analysis was developed by Gary King in the late '90s, has been refined since then, and is widely used by expert witnesses in voting rights cases.

19.     Under certain circumstances, EI can be used to determine whether there was racially polarized voting in an election. Specifically, EI can estimate the proportion of a racial group who voted for a candidate, i.e., the proportion of Black voters who voted for a candidate.

20.     Because EI estimates are based on differences in racial compositions and vote distributions across precincts, it is important to have a sufficient number of voting precincts. While there is no hard and fast rule, it is my experience that EI analysis tends to produce unreliable estimates when there are fewer than 15 precincts.

21.     To-date there have been three significant advancements in EI methods.

22.     The first advancement took place in the late '90s when King initially introduced EI.[4]  In the years that followed, the political science and statistics communities identified a major problem with King's method.  At that time, EI could only be used to estimate voter support when there were two racial groups (e.g., white and Black) and two candidates.  If there were more than two racial groups (e.g., white, Black, and Latino), then one would have to run an independent EI analysis for each race of interest and for each candidate of interest, an approach suggested by King and labeled the 'iterative' approach to 'R x C' estimation.[5]  King himself quickly recognized the flaws in this iterative approach, as did other scholars.[6]

23.     Shortly after suggesting the iterative method, King published a more advanced theoretical approach to R x C estimation, including as well a practical implementation of a replacement for the flawed iterative method.[7]  This second King method of producing EI estimates, because it could appropriately accommodate elections with several races and/or candidates, quickly became the standard approach utilized by experts any case involving more than the simplest two candidate by two race estimation.  This second King method was actually an approximation of a more advanced Bayesian technique, outlined by King and colleagues in the same 2001 article, that was, at the time, viewed as computationally impractical given that it

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[4] King, Gary. (1997). *A Solution to the Ecological Inference Problem*. Princeton Univ. Press.
[5] In practice, this would involve simulating a two-race analysis by comparing the racial group of interest against a "dummy" group comprising the combination of all the other races.  So instead of comparing the Black population against the White population (as one would do if there were actually only two races of interest), one would compare the Black population against the combination of the White and Latino population.  Then, because one is interested in each race individually (and not interested in, for example, how the combined White and Latino population voted), one would compare the White population against the Black and Latino population.  Finally, one would compare the Latino population against the White and Black population.
[6] See "Iterative Approaches to R $\times$ C Ecological Inference Problems: Where They Can Go Wrong and One Quick Fix", Ferree, Karen, *Political Analysis*, Spring 2004.
[7] See Rosen, Jiang, King, and Tanner., *Bayesian and Frequentist Inference for Ecological Inference: The* R x C *Case*, 55 STATISTICA NEERLANDICA 134 (2001).

could take as long as a week or more to run a single model on the computers available at that time.

24.    Finally, in 2007 a software module called "eiPack" was introduced that allowed for the estimation of the Bayesian approach that King had outlined earlier.[8]  This third method involves the same concepts as the second method, but takes advantage of advancements in computing technology, such that it can apply the method directly, without relying on a non-linear least squares approximation.

**B.    Evaluating Dr. Cole's EI Analysis**

25.    I evaluated Dr. Cole's EI analysis and have identified three major flaws in his report that undermine the reliability of his estimates: First, Dr. Cole does not take into account the low number of precincts present in the District.  Second, Dr. Cole appears to have used an outdated and unreliable implementation of EI.  Third, Dr. Cole did not include any measurements of reliability with his estimates.

26.    The first problem with Dr. Cole's EI analysis is that it does not acknowledge or address the low number of precincts involved in the District elections.  There are only ten election precincts used in District elections, well below the number of precincts normally used in EI analyses.  This problem would likely be compounded by the relatively low number of voters in each precinct which would also make it difficult to obtain reliable EI estimates, particularly in light of the necessity here of using census voting age population estimates rather than actual registered or turned-out voter data.

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[8] See Lau, Olivia, Ryan T. Moore, and Michael Kellermann. "eiPack: Ecological Inference and Higher-Dimension Data Management," R News, vol.7, no. 2 (October 2007).

27.     The second problem with Dr. Cole's EI analysis is that he appears to have used an outdated and unreliable EI method.  In his report, Dr. Cole does not specify which version of EI he used to perform his analysis.  However, at his deposition, Dr. Cole explained that he performed his EI analysis using a program called "EzI."[9]

28.     I am familiar with EzI.  EzI was one of the first implementations of King's EI method.  By today's standards the program is clearly outdated.  Indeed, at his deposition, Dr. Cole testified that EzI runs on a "DOS-based" operating system.[10]

29.     It is my understanding that EzI implemented the first generation of King's EI analysis, as discussed above.  Dr. Cole's testimony at his deposition seems to confirm that understanding, as he explained that he performed a separate 2x2 analysis for each race and for each candidate.[11]

30.     The generally accepted practice among statisticians and social scientists is to use the second or third generation of King's EI method (the third generation produces slightly better estimates, but the second generation is much faster).  Statisticians and social scientists have long recognized that the first generation, iterative "2x2" model is flawed and does not produce accurate or reliable estimates when used, as it was here, to produce iterative R x C estimates rather than the simple 2x2 estimates it was originally designed for.   It is my opinion that Dr. Cole's use of first generation EI methods renders his analysis unreliable.

31.     The fact that Dr. Cole's EI results are unreliable is also indicated by the fact that he was unable to generate estimates for two of his quantities of interest.  Specifically, he was not able to estimate the percent of Latino voters who supported Alan Keith Jones in the May

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[9] Cole Tr. 67.

[10] *Id.*

[11] *Id.* at 85 ("Each set of racial data is run separately; so that Latinos versus everybody else, Blacks versus everybody else, Whites versus everybody else.").

2015 election, nor was he able to estimate the percent of Latino voters who supported Yisroel

Eisenbach in the May 2015 election.  During his deposition, Dr. Cole stated that "the EI program

[did not] have enough information to calculate an estimate" of those percentages.[12]  In my

experience, current EI software packages are typically able to generate estimates for each

quantity of interest, given sufficient iterations.  To the extent there is a lack of informative data,

this is reflected in the broad confidence interval for a particular estimate.  The fact that Dr. Cole

was unable to generate estimates for each quantity of interest is an additional indicator that there

is a serious flaw in the way he conducted his EI analysis, and that this flaw is interacting with

serious data limitations.[13]

      32.     The third problem with Dr. Cole's EI analysis is that he does not include

any measurements of reliability.  The standard practice among social scientists and statisticians is

to accompany specific EI estimates (referred to as "point estimates") with associated confidence

intervals.

      33.     Confidence intervals are used as a general indicator of how certain we

should be about the actual value of a given point estimate.  Confidence intervals include two

components: a range of values and a confidence level, expressed as a percent.  The standard

practice among social scientists and statisticians is to construct confidence intervals at a 95%-

level.  If a 95%-confidence interval is properly constructed, we can say that we are 95%

confident that the interval contains the true value of the quantity of interest (e.g., the true

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[12] Cole Tr. 131.

[13] Dr. Cole disclosed the output pages generated by his EI software for each of his analyses.  Notably, those pages did not include any outputs relating to his estimates of Latino support for Mr. Jones or Mr. Eisenbach in the 2015 election.  That omission makes it difficult for me to determine why his software was unable to generate estimates for those candidates.

proportion of Black voter support for a candidate).  The ability to calculate a confidence interval

is included in all current software implementations of EI that I have seen.

      34.      When interpreting EI results, the standard practice among social scientists

and statisticians is to rely on confidence intervals in conjunction with point estimates.  For

example, if an EI analysis estimates that a candidate received 55% of the Black vote, with a 95%

confidence interval between 53% and 57%, one could conclude, with a 95% level of confidence,

that the candidate received a majority of the Black vote, since 50% falls outside of the entire

95% confidence interval.  However, if the confidence interval for the same 55% point estimate

ranged between 25% and 85%, then one would *not* be able to conclude that the candidate

received a majority of the Black vote, since multiple possible values at or below 50% lie within

the 95% confidence interval.

      35.      Thus, without a confidence interval, one cannot conclude that an EI

estimate is reliable—a point estimate, by itself, does not provide any indication of how wide the

confidence interval is.

      36.      Dr. Cole did not include a confidence interval in his report.  At his

deposition, he testified that he did not calculate confidence intervals.[14]  In my opinion, this

renders his EI estimates and analysis unreliable.

      37.      At his deposition, Dr. Cole testified that he "generate[d] approximate

confidence intervals in [his] mind."  Confidence intervals are statistical indicators properly

produced by statistical software or by explicit mathematical calculation that can be reported by

an expert in their report and replicated by another expert to confirm their validity.  A mental

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[14] Cole Tr. 80, 138, 157.

estimate, not produced in this fashion, is not an acceptable substitute in social science methodology.

### C.    Independent EI Analysis

38.    In evaluating Dr. Cole's EI estimates, I conducted my own EI analysis.  I conducted my own analysis to see if I could replicate Dr. Cole's results and to determine whether an EI analysis of District elections would be accompanied by large confidence intervals (and thus, unreliable estimates).

39.    In conducting my EI analysis, I used the third-generation version of EI. The method I used is fully described in the Rosen, Jiang, King, and Tanner article referenced above in footnote 7.  I ran my EI analysis in R using a software package/module called ei.MD.bayes called from the widely used package of EI routines called eiPack as referenced above in footnote 8.  I have attached a copy of the script I used to perform my analysis as Appendix 2 to this declaration.

40.    I regularly use this method of EI analysis when consulting or testifying in voting rights cases.  None of my EI analyses has ever been deemed unreliable or excluded by a court.

41.    Because I sought to replicate Dr. Cole's results, I used the same data inputs as Dr. Cole.

42.    The results of my EI analysis are reproduced in the table below.

| Candidate | Election Date | Race | White Vote % | Black Vote % | Latino Vote % |
|---|---|---|---|---|---|
| Mark Berkowitz* | 5/16/17 | W | 86% (75, 95) | 54% (12, 90) | 73% (40, 95) |
| Alexandra K. Manigo | 5/16/17 | W | 14% (5, 25) | 46% (10, 88) | 27% (5, 60) |
| Harry Grossman* | 5/16/17 | W | 86% (75, 96) | 53% (10, 89) | 26% (5, 60) |
| Eric Goodwin | 5/16/17 | B | 14% (4, 25) | 47% (11, 90) | 74% (40, 95) |
| Joel Freilich* | 5/16/17 | W | 87% (77, 96) | 59% (14, 92) | 31% (7, 65) |
| Chevon Dos Reis | 5/16/17 | L | 13% (4, 23) | 41% (8, 86) | 69% (35, 93) |
| **Candidate** | **Election Date** | **Race** | **White Vote %** | **Black Vote %** | **Latino Vote %** |
| Bernard L. Charles, Jr.* | 5/17/16 | B | 85% (74, 95) | 59% (13, 91) | 34% (7, 69) |
| Kim A. Foskew | 5/17/16 | W | 15% (5, 26) | 41% (9, 87) | 66% (31, 93) |
| Pierre Germain* | 5/17/16 | B | 85% (74, 94) | 58% (14, 92) | 32% (6, 66) |
| Jean E. Fields | 5/17/16 | B | 15% (6, 26) | 42% (8, 86) | 68% (34, 94) |
| Yehuda Weissmandl* | 5/17/16 | W | 84% (73, 94) | 56% (11, 92) | 27% (5, 60) |
| Natashia E. Morales | 5/17/16 | L | 16% (6, 27) | 44% (8, 89) | 73% (40, 95) |
| Sabrina Charles-Pierre | 5/17/16 | B | N/A | N/A | N/A |
| **Candidate** | **Election Date** | **Race** | **White Vote %** | **Black Vote %** | **Latino Vote %** |
| Jacob L. Lefkowitz* | 5/19/15 | W | 82% (70, 93) | 42% (6, 81) | 17% (3, 43) |
| Sabrina Charles-Pierre | 5/19/15 | B | 16% (6, 29) | 53% (15, 89) | 75% (45, 92) |
| Alan Keith Jones | 5/19/15 | B | 1% (0, 3) | 5% (1, 16) | 8% (2, 20) |
| Yonah Rothman* | 5/19/15 | W | 82% (69, 94) | 48% (8, 86) | 20% (3, 52) |
| Natasha Morales | 5/19/15 | L | 18% (6, 31) | 52% (14, 92) | 80% (48, 97) |
| Juan Pablo Ramirez* | 5/19/15 | L | 78% (65, 89) | 47% (8, 84) | 21% (4, 50) |
| Steve D. White | 5/19/15 | W | 17% (6, 30) | 49% (12, 87) | 74% (43, 93) |
| Yisroel Eisenbach | 5/19/15 | W | 6% (3, 8) | 5% (0, 15) | 5% (1, 14) |
| **Candidate** | **Election Date** | **Race** | **White Vote %** | **Black Vote %** | **Latino Vote %** |
| MaraLuz Corado* | 5/21/13 | L | 84% (67, 96) | 50% (10, 87) | 23% (4, 54) |
| Margaret Tuck | 5/21/13 | B | 17% (4, 33) | 50% (13, 90) | 77% (46, 96) |
| Pierre Germain* | 5/21/13 | B | 80% (67, 92) | 52% (11, 88) | 26% (5, 59) |
| Eustache Clerveaux | 5/21/13 | B | 20% (8, 33) | 48% (12, 89) | 74% (41, 95) |
| Bernard L. Charles, Jr.* | 5/21/13 | B | 80% (66, 92) | 52% (11, 89) | 25% (5, 57) |
| Robert Forest | 5/21/13 | B | 20% (8, 34) | 48% (11, 89) | 75% (43, 95) |

43.     The table contains six columns.  The first column lists the name of each candidate who ran for a contested seat on the Board between 2013 and 2017.  Consecutive rows are shaded to indicate which candidates ran against each other.  For example, in 2013, MaraLuz Corado ran against Margaret Tuck, Pierre Germain ran against Eustache Clerveaux, and Bernard L. Charles, Jr. ran against Robert Forest.  The winner of each election is indicated with a "*".  The second column lists the date of each election.  The third column indicates the race of the

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candidate.  The fourth column contains the point estimate and 95% confidence interval for the

percent of white voters who voted for each candidate.  The fifth column contains the point

estimate and 95% confidence interval for the percent of Black voters who voted for each

candidate.  The sixth column contains the point estimate and 95% confidence interval for the

percent of Latino voters who voted for each candidate.

44.    The most important thing to recognize from my EI analysis is that each of

the estimates relating to Black and Latino voters is accompanied by a very wide confidence

interval.

45.    Indeed, in the two-candidate races, *all* of the confidence intervals relating

to Black voter support include fifty-percent.  That means that, for each election, the EI results

cannot tell us, with 95% confidence, which candidate received a majority of the Black votes.

46.    What's more, in the two-candidate races, *all* of the confidence intervals

relating to Black voter support span over seventy-five percent of all possible outcomes.  For

example, the most reliable estimates of Black voter support (that is, the estimates accompanied

by the smallest confidence interval) indicate that Pierre Germain received somewhere between

11% and 88% of the Black vote in 2013.  At 88% support for Germain this would indicate that

Black voters gave cohesive support to him, while 11% support would indicate that Black voters

gave cohesive support to his opponent.  Most of the possible range between these endpoints

would indicate, as would the point estimate of 52%, that Black voters did not give cohesive

support to either candidate in this contest.  In practical terms, that tells us nothing about the level

of Black support, other than the fact that Mr. Germain received at least *some* Black support, but

did not receive literally *all* of the Black votes.  The same is true for every other candidate

included in the EI analysis (with the minor exception of Alan Keith Jones and Yisroel Eisenbach,

who each participated in a three-candidate election and received a very small fraction of all votes—the EI analysis allows us to conclude, with 95% confidence, that both Mr. Jones and Mr. Eisenbach received between ~0-15% of the Black vote, and a similar low percentage of support from Hispanic and white voters as well).

47.     The confidence intervals are not much better when it comes to the point estimates of Latino voter support. In the two-candidate races, *all* of the confidence intervals relating to Latino voter support include fifty-percent. Once again, this means that the EI results cannot tell us, with 95% confidence, which candidate received a majority of the Latino votes.

48.     In the two-candidate races, *all* of the confidence intervals relating to Latino voter support span over forty-five percent of all possible outcomes.[15]

49.     While I cannot offer a definitive explanation for the wide confidence intervals, I think it is likely that the EI analysis yielded wide confidence intervals because of the relatively low number of Black and Latino voters and because of the relatively low number of voting precincts in the District. The wide confidence intervals suggest that using the point estimates from an EI analysis by themselves is not a reliable method for analyzing Black and Latino voting patterns in District elections. The very wide confidence intervals are functioning here, as they should, as a diagnostic tool that indicates that the point estimates are simply not informative with regard to minority voting behavior given the constraints inherent in the precinct level data available here.

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[15] The confidence intervals relating to White voter support are much narrower than the intervals associated with Black and Latino voter support. While the intervals are still larger than I would like, they suggest that we can use my EI analysis to draw some limited conclusions about White voter support. For example, the EI analysis indicates that in the 2017 election, we can say with 95% confidence that Mark Berkowitz received between 75% and 95% of the White vote. That means that we can assert, with confidence that Mr. Berkowitz won the White vote by a considerable margin.

50.    The wide confidence intervals associated with my EI estimates make it impossible to use the EI analysis to draw any conclusions relating to racially polarized voting. Racially polarized voting is assessed for Section 2 purposes using the long established *Gingles* framework.  The *Gingles* prong-two threshold test asks whether the minority group votes cohesively in support of its candidates.  The issue of white bloc voting, considered in *Gingles* prong three, is reached only if minority cohesion is satisfactorily demonstrated in *Gingles* prong two.  Put another way, one cannot determine whether Blacks and whites voted differently if one cannot determine how Black voters voted in the first place.

51.    Comparing the results of my EI analysis with the results of Dr. Cole's EI analysis reveals dramatic divergence.  Despite the fact that the confidence intervals associated with my EI analysis are quite large, the vast majority of Dr. Cole's point estimates relating to Black and Latino voting behavior fall outside of the corresponding confidence intervals I constructed.

52.    With respect to two-candidate races, Dr. Cole generated 20 estimates of Black voter support (one estimate for each of two candidates in ten elections).  14 of those 20 estimates fall outside of the corresponding confidence interval generated by my analysis.[16]

53.    With respect to two-candidate races, Dr. Cole generated 20 estimates of Latino voter support.  *All* of Dr. Cole's estimates of Latino support fall outside of the corresponding confidence interval generated by my analysis.  That is, *none* of Dr. Cole's estimates falls within the corresponding confidence interval generated by my analysis.

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[16] For example, the confidence interval associated with the 2016 race involving Bernard Charles indicates that somewhere between 13% and 91% of Black voters voted for Mr. Charles.  However, Dr. Cole estimates that 1.4% of Black voters voted for Mr. Charles.  Thus Dr. Cole's estimate falls outside of the confidence interval generated by my analysis.

54.     In my experience, this level of divergence between two EI analyses is unusual. In almost every case, two experts who evaluate the same elections using the same data will generate similar results. This level of divergence suggests that Dr. Cole's analysis, as the discussion of the well-known difficulties with the iterative 2x2 approach discussed above would lead us to expect, is not producing appropriate estimates of minority group voting in these elections.

### D.     Dr. Cole's Homogeneous Precinct Analysis

55.     In his report, Dr. Cole stated that he conducted a Homogeneous Precinct Analysis (HPA) using a "simple percentages" analysis.[17]

56.     Dr. Cole correctly recognizes that there are no homogeneous Latino or Black polling places in the District. As a result, HPA does not reveal anything about minority voting patterns in District elections, and thus does not speak to whether there is racially polarized voting in the District.

57.     The fundamental assumption of HPA analysis is that the proportion of voters of one race who support a candidate is the same from precinct to precinct. If that assumption does not hold, then HPA cannot be relied upon.

58.     While HPA can be used to estimate the proportion of white voters in a particular precinct who supported a candidate in a particular election, it cannot show how white voters in other precincts voted.

59.     Dr. Cole's failure to address this issue with HPA is especially problematic here because there is good reason to think that white voters in some parts of the District vote differently than white voters in other parts of the District. More specifically, it is my

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[17] Cole Report at 9-10.

understanding that members of the Orthodox and Hasidic communities (1) are predominantly white, (2) have particular and distinct policy preferences, such that they likely vote differently than whites who are not part of the Orthodox and Hasidic communities, and (3) are concentrated in just a few polling places in the District

### E.      Evaluating Dr. Cole's Use of Goodman Single-Equation Ecological Regression

60.     In his report, Dr. Cole stated that he used Goodman Single-Equation Ecological Regression.[18]  In fact, Dr. Cole did not use that method in his report.  Instead, he utilized only the bivariate correlation coefficient between racial composition and candidate support, calculated separately for each racial/ethnic group and each candidate, as were his EI estimates.[19]

61.     Like Dr. Cole's approach to estimating EI independently for each race/ethnicity and each candidate, the use of this same approach to the estimation of either Goodman's single regression, or the associated bivariate correlation coefficient, has long been known to be inappropriate.  Statisticians and social scientists generally recognize that Goodman's single regression method of analysis is not effective when used in a setting with more than two races, or when racial proportions are estimated with voting age population data (VAP) rather than determined by actual registration rates by race.[20]  Both of those negative factors are present here.

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[18] Cole Report at 9.

[19] Cole Report at 11-12; Cole Tr. 165-66.

[20] James W. Loewen & Bernard Grofman, *Recent Developments in Methods Used in Vote Dilution Litigation*, 21 Urb. Law. 589, 596 n.5 (1989).  This paper was cited  on page 9 of Dr. Cole's report.

62.     Finally, Dr. Cole's correlation coefficients for Black voters were not statistically significant.  As a rule, statisticians and social scientists do not rely on statistical estimates unless the estimates are statistically significant.

63.     At his deposition, Dr. Cole stated that he could rely on his correlation coefficients despite their lack of statistical significance because the correlation values were large.[21]  That statement is directly at odds with widely recognized and adopted statistical principles.  Statisticians and social scientists uniformly recognize that one cannot make up for a lack of statistical significance with a large effect size.

**F.     Evaluating Dr. Cole's Supplemental Research**

64.     In his report, Dr. Cole states that he used "supplemental research" to understand the "factual context of each of the Board elections."[22]  At his deposition, Dr. Cole stated that he relied upon his supplemental research to reach his conclusions and that the supplemental research caused him to assign less weight to the results of his EI analysis.[23]

65.     In describing his use of supplemental evidence, Dr. Cole stated that he followed a professionally recognized methodology in analyzing and collecting supplemental evidence.[24]  Nothing in his report, or in his deposition, offered anything to support the assertion that his collection of qualitative 'supplemental' data in this case was in any sense systematic or followed a clear protocol explicitly established in advance and adhered to carefully in its application.  Instead, Dr. Cole's approach to his 'supplemental' non-quantitative evidence appears to be extremely haphazard and ad hoc.  As such, Dr. Cole's "supplemental evidence" is

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[21] Cole Tr. 193 ("Q. If I also recall correctly your correlation analysis for the 2013 election for the Black voters, you did not generate an estimate that was statistically significant, right? A. That's correct, but the effect size of those correlations was of the magnitude that one can rely upon them."
[22] Cole Report at 13.
[23] Cole Tr. 195.
[24] Cole Tr. 87.

not a proper substitute for, or a proper replacement for, the established quantitative analysis

required to meet the threshold *Gingles* test of minority voter cohesion.
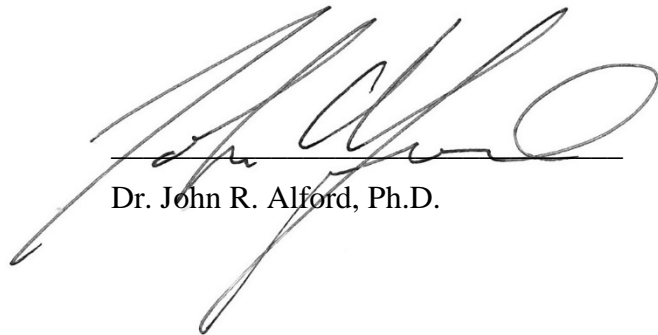
## VI.    CONCLUSION

66.    In sum, Dr. Cole's conclusions rest on an unreliable application of

unreliable methods.  In my opinion, Dr. Cole's estimates, along with his interpretation of those

estimates, is unreliable.

<p align="center">* * *</p>

67.    I reserve the right to supplement my report based ongoing facts and/or

changed assumptions.

68.    Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury of the

laws of the United States that the foregoing is true and correct to the best of my knowledge,

information, and belief.


Date:    February 19, 2018



_____
Dr. John R. Alford, Ph.D.

# APPENDIX 1

## John R. Alford
Curriculum Vitae
December, 2017

Dept. of Political Science
Rice University - MS-24
P.O. Box 1892
Houston, Texas  77251-1892
713-348-3364
jra@rice.edu

## Employment:
Full Professor, Rice University, 2015 to present.
Associate Professor, Rice University, 1985-2015.
Assistant Professor, University of Georgia, 1981-1985.
Instructor, Oakland University, 1980-1981.
Teaching-Research Fellow, University of Iowa, 1977-1980.
Research Associate, Institute for Urban Studies, Houston, Texas, 1976-1977.

## Education:
Ph.D., University of Iowa, Political Science, 1981.
M.A., University of Iowa, Political Science, 1980.
M.P.A., University of Houston, Public Administration, 1977.
B.S., University of Houston, Political Science, 1975.

## Books:
*Predisposed: Liberals, Conservatives, and the Biology of Political Differences.* New York: Routledge, 2013. Co-authors, John R. Hibbing and Kevin B. Smith.

## Articles:
"Intuitive ethics and political orientations:  Testing moral foundations as a theory of political ideology."  with Kevin Smith, John Hibbing, Nicholas Martin, and Peter Hatemi.  **American Journal of Political Science**.  (April, 2017).

"The Genetic and Environmental Foundations of Political, Psychological, Social, and Economic Behaviors: A Panel Study of Twins and Families."  with Peter Hatemi, Kevin Smith, and John Hibbing.  **Twin Research and Human Genetics**.  (May, 2015.)

"Liberals and conservatives: Non-convertible currencies."  with John R. Hibbing and Kevin B. Smith.  **Behavioral and Brain Sciences** (January, 2015).

"Non-Political Images Evoke Neural Predictors Of Political Ideology."  with Woo-Young Ahn, Kenneth T. Kishida, Xiaosi Gu, Terry Lohrenz, Ann Harvey, Kevin Smith, Gideon Yaffe, John Hibbing, Peter Dayan, P. Read Montague. **Current Biology**.  (November, 2014).

"Cortisol and Politics: Variance in Voting Behavior is Predicted by Baseline Cortisol Levels."  with Jeffrey French, Kevin Smith, Adam Guck, Andrew Birnie, and John Hibbing.  **Physiology & Behavior**.  (June, 2014).

"Differences in Negativity Bias Underlie Variations in Political Ideology."  with Kevin B. Smith and John R. Hibbing. **Behavioral and Brain Sciences**.  (June, 2014).

"Negativity bias and political preferences: A response to commentators Response."  with Kevin B. Smith and John R. Hibbing. **Behavioral and Brain Sciences**.  (June, 2014).

"Genetic and Environmental Transmission of Political Orientations."  with Carolyn L. Funk, Matthew Hibbing, Kevin B. Smith, Nicholas R. Eaton, Robert F. Krueger, Lindon J. Eaves, John R. Hibbing. **Political Psychology**, (December, 2013).

"Biology, Ideology, and Epistemology: How Do We Know Political Attitudes Are Inherited and Why Should We Care?" with Kevin Smith, Peter K. Hatemi, Lindon J. Eaves, Carolyn Funk, and John R. Hibbing.  **American Journal of Political Science**. (January, 2012)

"Disgust Sensitivity and the Neurophysiology of Left-Right Political Orientations." with Kevin Smith, John Hibbing, Douglas Oxley, and Matthew Hibbing, **PlosONE**, (October, 2011).

"Linking Genetics and Political Attitudes:  Re-Conceptualizing Political Ideology." with Kevin Smith, John Hibbing, Douglas Oxley, and Matthew Hibbing, **Political Psychology**, (June, 2011).

"The Politics of Mate Choice." with Peter Hatemi, John R. Hibbing, Nicholas Martin and Lindon Eaves, **Journal of Politics**, (March, 2011).

"Not by Twins Alone:  Using the Extended Twin Family Design to Investigate the Genetic Basis of Political Beliefs" with Peter Hatemi, John Hibbing, Sarah Medland, Matthew Keller, Kevin Smith, Nicholas Martin, and Lindon Eaves, **American Journal of Political Science**, (July, 2010).

"The Ultimate Source of Political Opinions:  Genes and the Environment" with John R. Hibbing in **Understanding Public Opinion**, 3rd Edition eds. Barbara Norrander and Clyde Wilcox, Washington D.C.:  CQ Press, (2010).

"Is There a 'Party' in your Genes" with Peter Hatemi, John R. Hibbing, Nicholas Martin and Lindon Eaves, **Political Research Quarterly**, (September, 2009).

"Twin Studies, Molecular Genetics, Politics, and Tolerance: A Response to Beckwith and Morris" with John R. Hibbing and Cary Funk, **Perspectives on Politics**, (December, 2008).  This is a solicited response to a critique of our 2005 APSR article "Are Political Orientations Genetically Transmitted?"

"Political Attitudes Vary with Physiological Traits" with Douglas R. Oxley, Kevin B. Smith, Matthew V. Hibbing, Jennifer L. Miller, Mario Scalora, Peter K. Hatemi, and John R. Hibbing, **Science**, (September 19, 2008).

"The New Empirical Biopolitics" with John R. Hibbing, **Annual Review of Political Science**, (June, 2008).

"Beyond Liberals and Conservatives to Political Genotypes and Phenotypes" with John R. Hibbing and Cary Funk, **Perspectives on Politics**, (June, 2008).  This is a solicited response to a critique of our 2005 APSR article "Are Political Orientations Genetically Transmitted?"

"Personal, Interpersonal, and Political Temperaments" with John R. Hibbing, **Annals of the American Academy of Political and Social Science**, (November, 2007).

"Is Politics in our Genes?" with John R. Hibbing, **Tidsskriftet Politik**, (February, 2007).

"Biology and Rational Choice" with John R. Hibbing, **The Political Economist**, (Fall, 2005)

"Are Political Orientations Genetically Transmitted?" with John R. Hibbing and Carolyn Funk, **American Political Science Review**, (May, 2005).  (The main findings table from this article has been reprinted in two college level text books - Psychology, 9th ed. and Invitation to Psychology 4th ed. both by Wade and Tavris, Prentice Hall, 2007).

"The Origin of Politics:  An Evolutionary Theory of Political Behavior" with John R. Hibbing, **Perspectives on Politics**, (December, 2004).

"Accepting Authoritative Decisions:  Humans as Wary Cooperators" with John R. Hibbing, **American Journal of Political Science**, (January, 2004).

"Electoral Convergence of the Two Houses of Congress" with John R. Hibbing, in **The Exceptional Senate**, ed. Bruce Oppenheimer, Columbus: Ohio State University Press, (2002).

"We're All in this Together:  The Decline of Trust in Government, 1958-1996." in **What is it About Government that Americans Dislike?**, eds. John Hibbing and Beth Theiss-Morse, Cambridge: Cambridge University Press, (2001).

"The 2000 Census and the New Redistricting," **Texas State Bar Association School Law Section Newsletter**, (July, 2000).

"Overdraft:  The Political Cost of Congressional Malfeasance" with Holly Teeters, Dan Ward, and Rick Wilson, **Journal of Politics** (August, 1994).

"Personal and Partisan Advantage in U.S. Congressional Elections, 1846-1990" with David W. Brady, in **Congress Reconsidered** 5th edition, eds. Larry Dodd and Bruce Oppenheimer, CQ Press, (1993).

"The 1990 Congressional Election Results and the Fallacy that They Embodied an Anti-Incumbent Mood" with John R. Hibbing, **PS** 25 (June, 1992).

"Constituency Population and Representation in the United States Senate" with John R. Hibbing. **Legislative Studies Quarterly**, (November, 1990).

"Editors' Introduction:  Electing the U.S. Senate" with Bruce I. Oppenheimer.  **Legislative Studies Quarterly**, (November, 1990).

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"Personal and Partisan Advantage in U.S. Congressional Elections, 1846-1990" with David W. Brady, in **Congress Reconsidered** 4th edition, eds. Larry Dodd and Bruce Oppenheimer, CQ Press, (1988). Reprinted in The Congress of the United States, 1789-1989, ed. Joel Silby, Carlson Publishing Inc., (1991), and in The Quest for Office, eds. Wayne and Wilcox, St. Martins Press, (1991).

"Can Government Regulate Fertility?  An Assessment of Pro-natalist Policy in Eastern Europe" with Jerome Legge.  **The Western Political Quarterly** (December, 1986).

"Partisanship and Voting" with James Campbell, Mary Munro, and Bruce Campbell, in **Research in Micropolitics.  Volume 1 - Voting Behavior**.  Samuel Long, ed.  JAI Press, (1986).

"Economic Conditions and Individual Vote in the Federal Republic of Germany" with Jerome S. Legge.  **Journal of Politics** (November, 1984).

"Television Markets and Congressional Elections" with James Campbell and Keith Henry. **Legislative Studies Quarterly** (November, 1984).

"Economic Conditions and the Forgotten Side of Congress:  A Foray into U.S. Senate Elections" with John R. Hibbing, **British Journal of Political Science** (October, 1982).

"Increased Incumbency Advantage in the House" with John R.  Hibbing, **Journal of Politics** (November, 1981).  Reprinted in The Congress of the United States, 1789-1989, Carlson Publishing Inc., (1991).

"The Electoral Impact of Economic Conditions:  Who is Held Responsible?" with John R. Hibbing, **American Journal of Political Science** (August, 1981).

"Comment on Increased Incumbency Advantage" with John R. Hibbing, Refereed communication: **American Political Science Review** (March, 1981).

"Can Government Regulate Safety?  The Coal Mine Example" with Michael Lewis-Beck, **American Political Science Review** (September, 1980).

## Awards and Honors:

CQ Press Award - 1988, honoring the outstanding paper in legislative politics presented at the 1987 Annual Meeting of the American Political Science Association.  Awarded for "The Demise of the Upper House and the Rise of the Senate: Electoral Responsiveness in the United States Senate" with John Hibbing.

## Research Grants:

National Science Foundation, 2009-2011, "Identifying the Biological Influences on Political Temperaments", with John Hibbing, Kevin Smith, Kim Espy, Nicolas Martin and Read Montague.

This is a collaborative project involving Rice, University of Nebraska, Baylor College of Medicine, and Queensland Institute for Medical Research.

National Science Foundation, 2007-2010, "Genes and Politics:  Providing the Necessary Data", with John Hibbing, Kevin Smith, and Lindon Eaves.  This is a collaborative project involving Rice, University of Nebraska, Virginia Commonwealth University, and the University of Minnesota.

National Science Foundation, 2007-2010, "Investigating the Genetic Basis of Economic Behavior", with John Hibbing and Kevin Smith.  This is a collaborative project involving Rice, University of Nebraska, Virginia Commonwealth University, and the Queensland Institute of Medical Research.

Rice University Faculty Initiatives Fund, 2007-2009, "The Biological Substrates of Political Behavior". This is in assistance of a collaborative project involving Rice, Baylor College of Medicine, Queensland Institute of Medical Research, University of Nebraska, Virginia Commonwealth University, and the University of Minnesota.

National Science Foundation, 2004-2006, "Decision-Making on Behalf of Others", with John Hibbing.  This is a collaborative project involving Rice and the University of Nebraska.

National Science Foundation, 2001-2002, dissertation grant for Kevin Arceneaux, "Doctoral Dissertation Research in Political Science: Voting Behavior in the Context of U.S. Federalism."

National Science Foundation, 2000-2001, dissertation grant for Stacy Ulbig, "Doctoral Dissertation Research in Political Science: Sub-national Contextual Influences on Political Trust."

National Science Foundation, 1999-2000, dissertation grant for Richard Engstrom, "Doctoral Dissertation Research in Political Science: Electoral District Structure and Political Behavior."

Rice University Research Grant, 1985, Recent Trends in British Parliamentary Elections.

Faculty Research Grants Program, University of Georgia, Summer, 1982. Impact of Media Structure on Congressional Elections, with James Campbell.

## Papers Presented:

"The Physiological Basis of Political Temperaments" 6th European Consortium for Political Research General Conference, Reykjavik, Iceland (2011), with Kevin Smith, and John Hibbing.

"Identifying the Biological Influences on Political Temperaments" National Science Foundation Annual Human Social Dynamics Meeting (2010), with John Hibbing, Kimberly Espy, Nicholas Martin, Read Montague, and Kevin B. Smith.

"Political Orientations May Be Related to Detection of the Odor of Androstenone" Annual meeting of the Midwest Political Science Association, Chicago, IL (2010), with Kevin Smith, Amanda  Balzer, Michael  Gruszczynski, Carly M. Jacobs, and John Hibbing.

"Toward a Modern View of Political Man: Genetic and Environmental Transmission of Political Orientations from Attitude Intensity to Political Participation" Annual meeting of the American Political Science Association, Washington, DC (2010), with Carolyn Funk, Kevin Smith, and John Hibbing.

"Genetic and Environmental Transmission of Political Involvement from Attitude Intensity to Political Participation" Annual meeting of the International Society for Political Psychology, San Francisco, CA (2010), with Carolyn Funk, Kevin Smith, and John Hibbing.

"Are Violations of the EEA Relevant to Political Attitudes and Behaviors?" Annual meeting of the Midwest Political Science Association, Chicago, IL (2010), with Kevin Smith, and John Hibbing.

"The Neural Basis of Representation" Annual meeting of the American Political Science Association, Toronto, Canada (2009), with John Hibbing.

"Genetic and Environmental Transmission of Value Orientations" Annual meeting of the American Political Science Association, Toronto, Canada (2009), with Carolyn Funk, Kevin Smith, Matthew Hibbing, Pete Hatemi, Robert Krueger, Lindon Eaves, and John Hibbing.

"The Genetic Heritability of Political Orientations: A New Twin Study of Political Attitudes" Annual Meeting of the International Society for Political Psychology, Dublin, Ireland (2009), with John Hibbing, Cary Funk, Kevin Smith, and Peter K Hatemi.

"The Heritability of Value Orientations" Annual meeting of the Behavior Genetics Association, Minneapolis, MN (2009), with Kevin Smith, John Hibbing, Carolyn Funk, Robert Krueger, Peter Hatemi, and Lindon Eaves.

"The Ick Factor: Disgust Sensitivity as a Predictor of Political Attitudes" Annual meeting of the Midwest Political Science Association, Chicago, IL (2009), with Kevin Smith, Douglas Oxley Matthew Hibbing, and John Hibbing.

"The Ideological Animal: The Origins and Implications of Ideology" Annual meeting of the American Political Science Association, Boston, MA (2008), with Kevin Smith, Matthew Hibbing, Douglas Oxley, and John Hibbing.

"The Physiological Differences of Liberals and Conservatives" Annual meeting of the Midwest Political Science Association, Chicago, IL (2008), with Kevin Smith, Douglas Oxley, and John Hibbing.

"Looking for Political Genes: The Influence of Serotonin on Political and Social Values" Annual meeting of the Midwest Political Science Association, Chicago, IL (2008), with Peter Hatemi, Sarah Medland, John Hibbing, and Nicholas Martin.

"Not by Twins Alone:  Using the Extended Twin Family Design to Investigate the Genetic Basis of Political Beliefs" Annual meeting of the American Political Science Association, Chicago, IL (2007), with Peter Hatemi, John Hibbing, Matthew Keller, Nicholas Martin, Sarah Medland, and Lindon Eaves.

"Factorial Association: A generalization of the Fulker between-within model to the multivariate case" Annual meeting of the Behavior Genetics Association, Amsterdam, The Netherlands (2007), with Sarah Medland, Peter Hatemi, John Hibbing, William Coventry, Nicholas Martin, and Michael Neale.

"Not by Twins Alone:  Using the Extended Twin Family Design to Investigate the Genetic Basis of Political Beliefs" Annual meeting of the Midwest Political Science Association, Chicago, IL (2007), with Peter Hatemi, John Hibbing, Nicholas Martin, and Lindon Eaves.

"Getting from Genes to Politics:  The Connecting Role of Emotion-Reading Capability" Annual Meeting of the International Society for Political Psychology, Portland, OR, (2007.), with John Hibbing.

"The Neurological Basis of Representative Democracy."  Hendricks Conference on Political Behavior, Lincoln, NE (2006), with John Hibbing.

"The Neural Basis of Representative Democracy"  Annual meeting of the American Political Science Association, Philadelphia, PA (2006), with John Hibbing.

"How are Political Orientations Genetically Transmitted?  A Research Agenda"  Annual meeting of the Midwest Political Science Association, Chicago Illinois (2006), with John Hibbing.

"The Politics of Mate Choice"   Annual meeting of the Southern Political Science Association, Atlanta, GA (2006), with John Hibbing.

"The Challenge Evolutionary Biology Poses for Rational Choice"   Annual meeting of the American Political Science Association, Washington, DC (2005), with John Hibbing and Kevin Smith.

"Decision Making on Behalf of Others"  Annual meeting of the American Political Science Association, Washington, DC (2005), with John Hibbing.

"The Source of Political Attitudes and Behavior: Assessing Genetic and Environmental Contributions"   Annual meeting of the Midwest Political Science Association, Chicago Illinois (2005), with John Hibbing and Carolyn Funk.

"The Source of Political Attitudes and Behavior: Assessing Genetic and Environmental Contributions" Annual meeting of the American Political Science Association, Chicago Illinois (2004), with John Hibbing and Carolyn Funk.

"Accepting Authoritative Decisions:  Humans as Wary Cooperators" Annual Meeting of the Midwest Political Science Association, Chicago, Illinois (2002), with John Hibbing

"Can We Trust the NES Trust Measure?" Annual Meeting of the Midwest Political Science Association, Chicago, Illinois (2001), with Stacy Ulbig.

"The Impact of Organizational Structure on the Production of Social Capital Among Group Members" Annual Meeting of the Southern Political Science Association, Atlanta, Georgia (2000), with Allison Rinden.

"Isolating the Origins of Incumbency Advantage:  An Analysis of House Primaries, 1956-1998" Annual Meeting of the Southern Political Science Association, Atlanta, Georgia (2000), with Kevin Arceneaux.

"The Electorally Indistinct  Senate," Norman Thomas Conference on Senate Exceptionalism, Vanderbilt University; Nashville, Tennessee; October (1999), with John R. Hibbing.

"Interest Group Participation and Social Capital" Annual Meeting of the Midwest Political Science Association, Chicago, Illinois (1999), with Allison Rinden.

"We're All in this Together:  The Decline of Trust in Government, 1958-1996."  The Hendricks Symposium, University of Nebraska, Lincoln. (1998)

"Constituency Population and Representation in the United States Senate," Electing the Senate; Houston, Texas; December (1989), with John R. Hibbing.

"The Disparate Electoral Security of House and Senate Incumbents," American Political Science Association Annual Meetings; Atlanta, Georgia; September (1989), with John R. Hibbing.

"Partisan and Incumbent Advantage in House Elections," Annual Meeting of the Southern Political Science Association (1987), with David W. Brady.

"Personal and Party Advantage in U.S. House Elections, 1846-1986" with David W. Brady, 1987 Social Science History Association Meetings.

"The Demise of the Upper House and the Rise of the Senate: Electoral Responsiveness in the United States Senate" with John Hibbing, 1987 Annual Meeting of the American Political Science Association.

"A Comparative Analysis of Economic Voting" with Jerome Legge, 1985 Annual Meeting of the American Political Science Association.

"An Analysis of Economic Conditions and the Individual Vote in Great Britain, 1964-1979" with Jerome Legge, 1985 Annual Meeting of the Western Political Science Association.

"Can Government Regulate Fertility?  An Assessment of Pro-natalist Policy in Eastern Europe" with Jerome Legge, 1985 Annual Meeting of the Southwestern Social Science Association.

"Economic Conditions and the Individual Vote in the Federal Republic of Germany" with Jerome S. Legge, 1984 Annual Meeting of the Southern Political Science Association.

"The Conditions Required for Economic Issue Voting" with John R. Hibbing, 1984 Annual Meeting of the Midwest Political Science Association.

"Incumbency Advantage in Senate Elections," 1983 Annual Meeting of the Midwest Political Science Association.

"Television Markets and Congressional Elections:  The Impact of Market/District Congruence" with James Campbell and Keith Henry, 1982 Annual Meeting of the Southern Political Science Association.

"Economic Conditions and Senate Elections" with John R. Hibbing, 1982 Annual Meeting of the Midwest Political Science Association. "Pocketbook Voting:  Economic Conditions and Individual Level Voting," 1982 Annual Meeting of the American Political Science Association.

"Increased Incumbency Advantage in the House," with John R. Hibbing, 1981 Annual Meeting of the Midwest Political Science Association.


## Other Conference Participation:

Roundtable Participant – Closing Round-table on Biopolitics; UC Merced Conference on Bio-Politics and Political Psychology, Merced, CA.

Roundtable Participant "Genes, Brains, and Core Political Orientations" 2008 Annual Meeting of the Southwestern Political Science Association, Las Vegas.

Roundtable Participant "Politics in the Laboratory" 2007 Annual Meeting of the Southern Political Science Association, New Orleans.

Short Course Lecturer, "What Neuroscience has to Offer Political Science" 2006 Annual Meeting of the American Political Science Association.

Panel chair and discussant, "Neuro-scientific Advances in the Study of Political Science" 2006 Annual Meeting of the American Political Science Association.

Presentation, "The Twin Study Approach to Assessing Genetic Influences on Political Behavior" Rice Conference on New Methods for Understanding Political Behavior, 2005.

Panel discussant, "The Political Consequences of Redistricting," 2002 Annual Meeting of the American Political Science Association.

Panel discussant, "Race and Redistricting," 1999 Annual Meeting of the Midwest Political Science Association.

Invited participant, "Roundtable on Public Dissatisfaction with American Political Institutions", 1998 Annual Meeting of the Southwestern Social Science Association.

Presentation, "Redistricting in the '90s," Texas Economic and Demographic Association, 1997.

Panel chair, "Congressional Elections," 1992 Annual Meeting of the Southern Political Science Association.

Panel discussant, "Incumbency and Congressional Elections," 1992 Annual Meeting of the American Political Science Association.

Panel chair, "Issues in Legislative Elections," 1991 Annual Meeting of the Midwest Political Science Association.

Panel chair, "Economic Attitudes and Public Policy in Europe," 1990 Annual Meeting of the Southern Political Science Association

Panel discussant, "Retrospective Voting in U.S. Elections," 1990 Annual Meeting of the Midwest Political Science Association.

Co-convener, with Bruce Oppenheimer, of Electing the Senate, a national conference on the NES 1988 Senate Election Study. Funded by the Rice Institute for Policy Analysis, the University of Houston Center for Public Policy, and the National Science Foundation, Houston, Texas, December, 1989.

Invited participant, Understanding Congress: A Bicentennial Research Conference, Washington, D.C., February, 1989.

Invited participant--Hendricks Symposium on the United States Senate, University of Nebraska, Lincoln, Nebraska, October, 1988

Invited participant--Conference on the History of Congress, Stanford University, Stanford, California, June, 1988.

Invited participant, "Roundtable on Partisan Realignment in the 1980's", 1987 Annual Meeting of the Southern Political Science Association.


## Professional Activities:

### Other Universities:

Invited Speaker, Annual Allman Family Lecture, Dedman College Interdisciplinary Institute, Southern Methodist University, 2016.

Invited Speaker, Annual Lecture, Psi Sigma Alpha – Political Science Dept., Oklahoma State University, 2015.

Invited Lecturer, Department of Political Science, Vanderbilt University, 2014.

Invited Speaker, Annual Lecture, Psi Kappa -the Psychology Club at Houston Community College, 2014.

Invited Speaker, Graduate Student Colloquium, Department of Political Science, University of New Mexico, 2013.

Invited Keynote Speaker, Political Science Alumni Evening, University of Houston, 2013.

Invited Lecturer, Biology and Politics Masters Seminar (John Geer and David Bader), Department of Political Science and Biology Department, Vanderbilt University, 2010.

Invited Lecturer, Biology and Politics Senior Seminar (John Geer and David Bader), Department of Political Science and Biology Department, Vanderbilt University, 2008.

Visiting Fellow, the Hoover Institution, Stanford University, 2007.

Invited Speaker, Joint Political Psychology Graduate Seminar, University of Minnesota, 2007.

Invited Speaker, Department of Political Science, Vanderbilt University, 2006.


**Member:**

Editorial Board, Journal of Politics, 2007-2008.

Planning Committee for the National Election Studies' Senate Election Study, 1990-92.

Nominations Committee, Social Science History Association, 1988


**Reviewer for:**

American Journal of Political Science
American Political Science Review
American Politics Research
American Politics Quarterly
American Psychologist
American Sociological Review
Canadian Journal of Political Science
Comparative Politics
Electoral Studies
Evolution and Human Behavior
International Studies Quarterly
Journal of Politics
Journal of Urban Affairs
Legislative Studies Quarterly
National Science Foundation
PLoS ONE
Policy Studies Review
Political Behavior
Political Communication
Political Psychology
Political Research Quarterly
Public Opinion Quarterly
Science
Security Studies
Social Forces
Social Science Quarterly

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Western Political Quarterly

## University Service:

Member, University Parking Committee, 2016-2017.

Member, University Benefits Committee, 2013-2016.

Internship Director for the Department of Political Science, 2004-2017.

Member, University Council, 2012-2013.

Invited Speaker, Rice Classroom Connect, 2016.

Invited Speaker, Glasscock School, 2016.

Invited Speaker, Rice Alumni Association, Austin, 2016.

Invited Speaker, Rice Alumni Association, New York City, 2016.

Invited Speaker, Rice TEDxRiceU , 2013.

Invited Speaker, Rice Alumni Association, Atlanta, 2011.

Lecturer, Advanced Topics in AP Psychology, Rice University AP Summer Institute, 2009.

Scientia Lecture Series: "Politics in Our Genes: The Biology of Ideology" 2008

Invited Speaker, Rice Alumni Association, Seattle, San Francisco and Los Angeles, 2008.

Invited Speaker, Rice Alumni Association, Austin, Chicago and Washington, DC, 2006.

Invited Speaker, Rice Alumni Association, Dallas and New York, 2005.

Director: Rice University Behavioral Research Lab and Social Science Computing Lab, 2005-2006.

University Official Representative to the Inter-university Consortium for Political and Social Research, 1989-2012.

Director: Rice University Social Science Computing Lab, 1989-2004.

Member, Rice University Information Technology Access and Security Committee, 2001-2002

Rice University Committee on Computers, Member, 1988-1992, 1995-1996; Chair, 1996-1998, Co-chair, 1999.

Acting Chairman, Rice Institute for Policy Analysis, 1991-1992.

Divisional Member of the John W. Gardner Dissertation Award Selection Committee, 1998

Social Science Representative to the Educational Sub-committee of the Computer Planning Committee, 1989-1990.

Director of Graduate Admissions, Department of Political Science, Rice University, 1986-1988.

Co-director, Mellon Workshop:  Southern Politics, May, 1988.

Guest Lecturer, Mellon Workshop:  The U.S. Congress in Historical Perspective, May, 1987 and 1988.

Faculty Associate, Hanszen College, Rice University, 1987-1990.

Director, Political Data Analysis Center, University of Georgia, 1982-1985.


## Expert Consulting:

Expert Witness, Arismendez v. Coastal Bend College, racially polarized voting analysis, 2017.

Expert Witness, United States v. City of Eastpoint, racially polarized voting analysis, 2017.

Expert Witness, Georgia NAACP v. Gwinnett County, racially polarized voting analysis, 2017.

Expert Witness for the State of Texas, Lopez, et al v. Abbott, a challenge to the current system of statewide at-large elections for the Texas Supreme Court and the Texas Court of Criminal Appeals, including election analysis, and racially polarized voting analysis, 2017.

Expert witness for the State of Texas, Perez, et al v State of Texas (and consolidated cases), challenge to adopted Texas election districts for the US Congress and the Texas House of Representatives, 2011-2017.

Expert Witness, Jain v. Coppell ISD, racially polarized voting analysis, 2016.

Consultant, City of Clute, Texas – Demographic analysis and redrawing of election districts, 2015.

Expert Witness, Ramos v. Carrollton-Farmers Branch ISD, racially polarized voting analysis, 2015.

Expert Witness, Columbus Partee, et al. v. Coahoma County, Mississippi, racially polarized voting analysis, 2015.

Expert Witness, Terrebonne Parish NAACP v. Jindal, racially polarized voting analysis, 2015.

Expert Witness, Patino v. City of Pasadena, racially polarized voting analysis, 2015.

Expert Witness, York v. City of St. Gabriel, racially polarized voting analysis, 2014.

Consultant, Houston ISD – Incorporation of North Forest ISD, Demographic analysis and redrawing of election districts, 2014.

Expert Witness, Rodriguez v. Grand Prairie ISD, racially polarized voting analysis, 2014.

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Expert Witness, Benevides, v Irving ISD, racially polarized voting analysis, 2014.

Expert Witness, Garcia-Sonnier et al v. Pasadena ISD, racially polarized voting analysis, 2013.

Expert witness, Montes v. City of Yakima, challenge to Yakima, Washington At-Large City Council Elections, 2012.

Consultant, Lamar ISD – Demographic analysis and redrawing of election districts, 2012.

**APPENDIX 2**
**Script for EI Analysis**

```
library(tidyverse)
library(eiPack)
rm(list = ls(all = TRUE))

currentdata <- haven::read_dta("C:\\Users\\randy\\Dropbox\\consulting\\New
York\\Trustee2017_seatofHopstein.dta")


formula1 <- cbind(V1, V2, novote) ~
cbind(VtdAVap_cor,VtdBVap_cor,VtdHVap_cor,VtdOVap_cor)
set.seed(12345)

tune.nocov <- tuneMD(formula1, data = currentdata, ntunes = 10, totaldraws = 100000)

md.out <- ei.MD.bayes(formula1, data = currentdata, sample = 100000, thin = 100,
burnin=100000, ret.mcmc=TRUE, tune.list = tune.nocov)
summary(md.out)




## produce goodman estimates (these may be more or less than 1)
good.out<-ei.reg(formula1, data = currentdata)

lam <- lambda.reg(good.out, c("V1", "V2", "novote"))

BgoodV1 <- lam$lambda["VtdBVap_cor","V1"]
BgoodV2 <- lam$lambda["VtdBVap_cor","V2"]

HgoodV1 <- lam$lambda["VtdHVap_cor","V1"]
HgoodV2 <- lam$lambda["VtdHVap_cor","V2"]

AgoodV1 <- lam$lambda["VtdAVap_cor","V1"]
AgoodV2 <- lam$lambda["VtdAVap_cor","V2"]

OgoodV1 <- lam$lambda["VtdOVap_cor","V1"]
OgoodV2 <- lam$lambda["VtdOVap_cor","V2"]


H.num.v1.est <- md.out$draws$Cell.counts[,"ccount.VtdHVap_cor.V1"]
H.num.v2.est <- md.out$draws$Cell.counts[,"ccount.VtdHVap_cor.V2"]
```

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```
H.num.vote.est <- H.num.v1.est+H.num.v2.est

H.share.v1.est <- H.num.v1.est/H.num.vote.est
H.share.v2.est <- H.num.v2.est/H.num.vote.est

HV1 <- mean(H.share.v1.est)
HV2 <- mean(H.share.v2.est)

qHv1<-quantile(H.share.v1.est, c(.025, .975))
qHv2<-quantile(H.share.v2.est, c(.025, .975))

Hvec1 <- cbind(HV1[[1]], qHv1[1][[1]], qHv1[2][[1]])
Hvec2 <- cbind(HV2[[1]], qHv2[1][[1]], qHv2[2][[1]])

A.num.v1.est <- md.out$draws$Cell.counts[,"ccount.VtdAVap_cor.V1"]
A.num.v2.est <- md.out$draws$Cell.counts[,"ccount.VtdAVap_cor.V2"]

A.num.vote.est <- A.num.v1.est+A.num.v2.est

A.share.v1.est <- A.num.v1.est/A.num.vote.est
A.share.v2.est <- A.num.v2.est/A.num.vote.est

Av1 <- mean(A.share.v1.est)
Av2 <- mean(A.share.v2.est)

qAv1<-quantile(A.share.v1.est, c(.025, .975))
qAv2<-quantile(A.share.v2.est, c(.025, .975))

Avec1 <- cbind(Av1[[1]], qAv1[1][[1]], qAv1[2][[1]])
Avec2 <- cbind(Av2[[1]], qAv2[1][[1]], qAv2[2][[1]])

B.num.v1.est <- md.out$draws$Cell.counts[,"ccount.VtdBVap_cor.V1"]
B.num.v2.est <- md.out$draws$Cell.counts[,"ccount.VtdBVap_cor.V2"]

B.num.vote.est <- B.num.v1.est+B.num.v2.est

B.share.v1.est <- B.num.v1.est/B.num.vote.est
B.share.v2.est <- B.num.v2.est/B.num.vote.est

Bv1 <- mean(B.share.v1.est)
Bv2 <- mean(B.share.v2.est)

qBv1<-quantile(B.share.v1.est, c(.025, .975))
qBv2<-quantile(B.share.v2.est, c(.025, .975))
```

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```
Bvec1 <- cbind(Bv1[[1]], qBv1[1][[1]], qBv1[2][[1]])
Bvec2 <- cbind(Bv2[[1]], qBv2[1][[1]], qBv2[2][[1]])


O.num.v1.est <- md.out$draws$Cell.counts[,"ccount.VtdOVap_cor.V1"]
O.num.v2.est <- md.out$draws$Cell.counts[,"ccount.VtdOVap_cor.V2"]

O.num.vote.est <- O.num.v1.est+O.num.v2.est

O.share.v1.est <- O.num.v1.est/O.num.vote.est
O.share.v2.est <- O.num.v2.est/O.num.vote.est

Ov1 <- mean(O.share.v1.est)
Ov2 <- mean(O.share.v2.est)

qOv1<-quantile(O.share.v1.est, c(.025, .975))
qOv2<-quantile(O.share.v2.est, c(.025, .975))

Ovec1 <- cbind(Ov1[[1]], qOv1[1][[1]], qOv1[2][[1]])
Ovec2 <- cbind(Ov2[[1]], qOv2[1][[1]], qOv2[2][[1]])


v1 <- cbind(1, Avec1, Bvec1, Hvec1, Ovec1, mean(AgoodV1), mean(BgoodV1),
mean(HgoodV1), mean(OgoodV1))
v2 <- cbind(2, Avec2, Bvec2, Hvec2, Ovec2, mean(AgoodV2), mean(BgoodV2),
mean(HgoodV2), mean(OgoodV2))

lamdas <- as_tibble(rbind(v1, v2))


haven::write_dta(lamdas, "C:\\Users\\randy\\Desktop\\New York
Results\\Trustee2017_seatofHopstein_results.dta", version = 14)
```

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